numerous instances in the claims where the Examiner does not make it clear why the language lacks clarity. Many of the terms used in the claims are terms normally referred to by those of ordinary skill in the art. In any event, as the Examiner can see, Applicants have made a bona fide attempt to address all the issues raised by the Examiner to the extent they have been understood.

Claim 16 has been amended to indicate the placement of the various components so that the Examiner can see in the claim how they are structurally inter-related. Thus, the signal transmitter is located adjacent the rig but remotely from the housing, while the plug stop assembly is on the housing, as is the signal receiver. The control system is indicated to be at least in part on the housing. It is respectfully submitted that describing the functional attributes of each of the elements and physically placing them while indicating how they inter-react gives a clear, concise claim which meets all the requirements of Section 112. Accordingly, claim 16 as amended now overcomes all of the rejections under Section 112. It should be noted that the preamble of claim 16 has been amended to more clearly define the nature of a plug-dropping apparatus and how it is used by personnel operating on a drilling rig. These clarifying amendments further illustrate the differences between claim 16 and the cited reference *Cook*, which requires actuation from a remote shore base with no one standing near the rig to reopen a flowline valve on a well already in service. The specific Section 103 rejections will be addressed later in the remarks.

The phrase "downward orientation" has been eliminated from claim 17. The signal transmitter location has previously been defined in claim 16 and, therefore, an orientation towards the signal transmitter is a precise definition of the receiver orientation. The location of the signal transmitter thus provides the needed point of reference sought by the Examiner. It is respectfully submitted that the signal transmitter has been structurally sufficiently defined as any apparatus that is capable of sending a signal over the air. It is respectfully submitted that sufficient definition of signal transmitter is provided in these

claims to make them specific so that one of ordinary skill in the art could determine whether there is infringement were such claims to be allowed. Claim 17 has also been reworded to indicate that the plurality of receivers are capable of receiving a transmitted signal despite the fact that the housing is rotating and/or reciprocating. To answer the Examiner's question, it is clear that claim 17 allows for the receipt of the signal despite this movement. Therefore, rotation or reciprocation of the housing does not affect the transmitting of the signal to the receiver. The transmitting of the signal continues in the same manner, despite the existence of rotation or reciprocation. What claim 17 is addressing is that the signal may still be received, even though the receivers are in motion, because there is a plurality of them. Accordingly, because of the plurality of receivers, the transmitted signal can be readily picked up, despite movement of the housing, either in rotation or reciprocation.

References to lowermost and uppermost have been eliminated in claim 18 and the housings are indicated to be stacked. Those of ordinary skill in the art know that if a plurality of plugs are to be dropped into the wellbore, they need to be in a stack so they can sequentially fall down into the wellbore at the time they are released.

The Examiner has made objections to certain language in claim 19, claiming that it is vague and indefinite. Although Applicants do not consider such language, which is normally used in claims, to be vague and indefinite, attempts have been made to address these rejections. Accordingly, the phrase "operably connecting" has been replaced by "linking"; "mounted to" has been replaced by "operated by." The reference to a "force" is still there because a biasing mechanism exists for the purpose of applying a force. That is the essence of what "to bias" means. Applicants would like further explanation from the Examiner of why the Examiner contends that the phrase "a force" is vague and indefinite. A biasing mechanism can be many different things, such as a spring, all of which store a potential energy force until released, whereupon the potential energy stored in the biasing mechanism results in a conversion of the potential energy into kinetic

energy, thereby forcing some object to move. The last paragraph of claim 20 has been completely rewritten for the purposes of addressing the Examiner's rejections under Section 112 to add further clarity to the sequence of events. What claim 20 addresses is that the biasing mechanism applies a force on the linkage, with the linkage in the locked position so that nothing can move until the lock mechanism is unlocked by virtue of the operation of the control system receiving a signal at the signal receiver from the transmitter. When this occurs, the biasing element forces the linkage to move the plug stop assembly, thereby allowing the plug to be released.

As to the Examiner's rejection of claim 20, it is respectfully submitted that the amendments to claim 19 have addressed the issues raised by the Examiner as to claim 20. In claim 19 the lock mechanism is operated by the control system and selectively locks the linkage. Claim 19 is not specific as to the exact placement of the lock mechanism. In claim 19 the lock mechanism can be either a part of the linkage itself or an extraneous member from the linkage which acts on the linkage, thus preventing its movement. Claim 20 is narrower than claim 19 since the lock mechanism is defined as being a component of the linkage which comprises a variable–length link. Hopefully this has straightened out the confusion that the Examiner is having between claims 19 and 20.

As to the Section 112 rejections of claim 21, the reference to "fluid force" has been eliminated, thus making claim 21 now read to have a piston that is lockable by any type of locking member, not just a fluid force. It should be noted that those skilled in the art will appreciate that hydraulics have long been used to actuate or to lock movable components in a control system. A piston that has a hydraulic or fluid circuit in fluid communication on both sides will not move unless the fluid on one side of the piston can be displaced to allow the piston to move. Thus, a pressurized fluid control circuit in communication with a cylinder on both sides of the piston will result in locking of the piston if a valve in that circuit is closed, precluding flow in the circuit. That is precisely the intent of claim 21. The control system may be used to selectively open or close the

valve, which in turn selectively allows the piston to move when the valve is open and locks the piston when the valve is closed. The reference to the control system has been added to address the Examiner's claimed apparent lack of antecedent basis regarding the relationship between the transmitter and the valve. For clarity, the reference has been made to the control system which is the last element in the series prior to the actuation of the valve. Stated differently, a signal is transmitted and received. The received signal is interpreted by the control system, which in turn actuates the valve into an open position. What follows as described in the specification is that the linkage is then unlocked where the biasing element can then actuate the rotation of the plug stop assembly for dropping the plug. Again, Applicants have had a great deal of difficulty responding to the 112 rejections which claim indefiniteness but do not in every case give reasons for why such conclusion is reached by the Examiner.

Claim 22 has been amended to indicate that the pin ultimately rotates to release the plug. The last paragraph has been rewritten to clearly indicate the sequence of what has been previously referred to as "priming." As now claimed in claim 22, with the valve in the second or open position, the piston is movable, thus allowing the pin to be turned into a first position where the pin can be locked by thereafter moving the valve back to its first or closed position. At that point the biasing element is applying a force but no movement can occur because of the locking. Once the control system opens the valve by moving it back to its second position, the biasing element can exert a force that ultimately rotates the pin from its first to its second position in order to release the plug. These amendments make it clear that the pin is what is rotating to release the plug and not the housing.

"Intrinsically safe" is specifically defined in the specification on page 9, ll. 19–22. Also defined in that section is a solenoid valve as one that is well–known in the art. A patentee can be his own lexicographer. The term "intrinsically safe" being specifically defined and being a term that is commonly used in the industry is respectfully submitted

to be sufficiently definite to meet the requirements of Section 112. A solenoid valve is an actuator for a valve that is well–known in the art. Simply, an electrical current is applied to a coil which creates a magnetic force to move a valve element in the magnetic field resulting from the flow of electrical current. Attempts have been made to amend claim 23 to address the solenoid issue to specifically indicate that the valve in question is actuated by a solenoid. Applicants are unaware of how to make this claim more specific than it already is and welcome any further input on this subject from the Examiner.

Claim 24 has been amended to cure the Examiner's rejection of the phrase "downward orientation," and claim 25 has been corrected to take out references to lowermost and uppermost.

As previously stated, claim 26 has been amended to indicate that the transmission of the signal occurs electronically and that the signal is electronically sensed and ultimately used to trigger the release of the ball or plug. This is readily distinguishable from manual operation because manual operation does not involve an electronic transmission, electronic sensing, or using the sensed electronic signal as the triggering event for dropping the ball or plug. Oral or hand signals require numerous other and different steps than those claimed in claim 26. Manual or hand signals do not involve electronic over–the–air transmission or reception, much less the use of the electronically received signal as the triggering event for the actual release.

In claim 27 the reference to one apparatus has been removed. The reference to "in series" has been removed in claim 28, and the reference to the signals refers back to the previous claims which have defined how the signals are transmitted.

In claim 29 the reference to "storing a force" has been eliminated and the claim has been rewritten so that the biasing device actually moves the linkage as an alternative to the prior language involving storing a force and then releasing it.

Claim 30 has been substantially rewritten. The introductory phrase has been changed to refer to the presentation of further steps, while the objected to references to priming, fluid locking, and trapping a stored force have been revised. As now presented, the plug support assembly is put in a first position where it supports the plug. A restorative force is created. The restorative force comes from the biasing device and acts through the linkage on the plug support assembly. The restorative force is initiated from the placement of the plug support assembly in a first position. The components are then locked, with the plug support assembly in the first position and the restorative force applied to the linkage. It should be noted that at this point there is no movement because of the locking step. The transmitted signal is used to unlock the linkage. Thereafter, the restorative force is liberated and results in movement of the plug support assembly, which in turn results in releasing of the ball or plug.

Applicants appreciate the time and effort the Examiner has taken to go over each and every one of these claims. However, Applicants respectfully request that in view of the great efforts made to address the Section 112 rejections that the Examiner provide any further input to the extent any of the rejections have not been addressed under Section 112.

Claims 1–15 and 31–38 have been canceled and will be presented in a divisional application.

The Examiner has combined the *LaFleur* '894 reference with the *Cook* '937 reference in rejecting all the claims for obviousness under 35 U.S.C. § 103. *LaFleur* shows a plug–dropping head for cement plugs which is operated by a series of pneumatic cylinders which rotate a link to allow the plug to drop. This reference is specifically discussed in the patent specification in this application. It is discussed because it has the shortcomings of unpredictability as to where the plug–dropping head will be mounted with respect to the rig floor. If it turns out that the plug–dropping head must be mounted substantially above the rig floor, the entire pneumatic control system will have to be

elevated to be placed adjacent to the plug–dropping head. Alternatively, an unwieldy system of very long hydraulic hoses will have to be extended from the rig floor to the remote location where the plug–dropping head finally is located. Another problem with the design of the *LaFleur* '894 is that if reciprocation and/or rotation are contemplated during the cementing procedure where the plugs must be dropped, the use of lengthy hydraulic leadlines can present issues relating to safety and operations as such types of movements can result in damage to the hydraulic control lines or considerably limit the amount of rotation that can be applied without snagging or cutting the hydraulic control lines which must be stretched from a point on the rig floor to the location where the plug–dropping head is ultimately mounted. Thus, for example, an apparatus as claimed in claim 17 that permits actuation at the same time there is rotation and/or reciprocation is not suggested by the *LaFleur* reference which, in fact, teaches the other way by making a rigid connection through flexible conduit such as hydraulic hoses, which presents, as previously stated, problems in accommodating such movements without endangering the integrity of the control system.

By combining *Cook* '937 and *LaFleur* '894, the Examiner has made a combination that is not suggested by the references. First of all, *Cook* '937 does not deal with plug–dropping heads at all. *Cook* uses a signal transmitted from a shore base to an already completed well. At the wellsite, the signal is received and processed and operates to actuate an actuator for a valve in the flowline. A subsidiary control circuit makes measurements of pressure in the flowline. If the flowline pressure fails to stabilize in a predetermined time, the main valve in the flowline, which has just been opened by the remote signal, is shut. Apart from not dealing with actuation of cement plugs, the *Cook* reference does not even deal with a well being drilled or completed. It is an invention directed to a well that has already been completed and placed in service. The trans–mission of the signal acts only to reopen a flowline valve which has been shut for a variety of reasons. The actuation is done remotely from shore as opposed to from the area

adjacent the rig during the drilling or completion process. The *Cook* reference does not address the issue of having a plug–dropping head located remotely from the rig floor at a time when the plugs need to be dropped. The *Cook* reference teaches away from a combination with *LaFleur* because to the extent *Cook* illustrates the use of a remote, over–the–air signal to operate a controlled element, it uses technology dramatically different from *LaFleur* which teaches a hydraulic system with flexible piping from the hydraulic pressure source to the final controlled element. The *LaFleur* references does not appreciate the need to accommodate translation and/or rotation simultaneously with the need to actuate the plug to drop. In essence, the technology and the purpose of the technology illustrated in *Cook* is for a completely different purpose, wholly nonanalogous to the application of *LaFleur*. While *LaFleur* deals with the problem addressed by the inventors in this application, it makes no suggestion of accommodation of translation and/or rotation as claimed in claim 17, for example, nor does it address the basic invention in the broadest pending claims 16 and 26 where, in the context of dropping a ball or a plug, an over–the–air system is used. It should be noted at this point that amendments have been made, particularly to claim 26, to distinguish the type of over–the–air signals employed from mere hand signals or audible signals. It is respectfully submitted that claim 26 clearly indicates an electronic signal transmitted over the air where the receipt of such a signal triggers the response to drop the plug. This is readily distinguishable from one rig hand on the rig floor shouting to another, who in turn manually operates the plug–dropping device.

It is respectfully submitted that the Examiner may be using impermissible hindsight by picking and choosing discrete elements from two different patents dealing with two discrete problems where neither reference makes a suggestion to incorporate the technology of one with the other to obtain the solution as now being claimed by the inventors in this case. For the reasons given above, as well as the clarifying amendments made in

response to Section 112, it is respectfully submitted that all the claims in this case are now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

8/16/94
Date

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CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8(a)

I hereby certify that this paper, along with any referred to as being attached or enclosed, is being forwarded to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, via the United States Postal Service, first class mail, postage prepaid, on this the 16 day of August, 1994.

STEVE ROSENBLATT

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